Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended): A method of ion texturing a noncrystalline surface of a layer of a cubic structure material, the method comprising:

exposing the noncrystalline surface to at least two ion beams to texture the noncrystalline surface and form a biaxially textured surface of the cubic structure material,

<u>wherein the at least two ion beams impinge on the noncrystalline surface in sequence, and</u>

wherein the at least two ion beams impinge on the surface of the noncrystalline layer at a first angle relative to a perpendicular to the noncrystalline surface, the at least two ion beams being disposed relative to each other at a second angle around the perpendicular to the noncrystalline surface so that a crystal plane of the biaxially textured surface is oriented perpendicular to the biaxially textured surface.

2. (original): The method of claim 1, wherein the cubic structure material comprises YSZ and the first angle is from about 51° to about 59°.

3. (original): The method of claim 2, wherein the first angle is about 55°.

4. (original): The method of claim 1, wherein the cubic structure material comprises YSZ and the YSZ is at a temperature of from about room temperature to about 900°C during ion texturing.

5. (original): The method of claim 4, wherein the first angle is about 55°.

6. (original): The method of claim 1, wherein the cubic structure material comprises a material selected from the group consisting of rock salt structure materials and fluorite structure materials.

7. (original): The method of claim 1, wherein the cubic structure material comprises a material selected from the group consisting of MgO, TiN, CaO, SrO, ZrO, BaO, YSZ and ceria.

8. (original): The method of claim 1, wherein the second angle is about 180°.

9. (original): The method of claim 1, wherein the second angle is about 90°.

10. (original): The method of claim 1, further comprising disposing a layer of a second material on the biaxially textured surface of the cubic structure material, the second material being selected from the group consisting of superconductor materials, precursors of superconductor materials, materials that are chemically compatible with superconductor materials, and materials that are chemically compatible with precursors of superconductor materials.

11. (original): The method of claim 10, wherein the second material is chemically compatible with BaF_2.

12. (original): The method of claim 10, wherein the second material is selected from the group consisting of ceria, $LaAlO_3$ and $SrTiO_3$.

13. (original): The method of claim 10, wherein the second material is selected from the group consisting of YBCO and precursors of YBCO.

14. (original): The method of claim 1, wherein biaxially textured surface of the cubic structure material is cube textured.

15. (original): The method of claim 1, further comprising, before exposing the noncrystalline surface to the at least two ion beams, forming the layer of the cubic structure material having the noncrystalline surface by simultaneously depositing the cubic material and exposing the cubic material to at least one ion beam.

16. (original): The method of claim 1, further comprising, after forming the biaxially textured surface, simultaneously depositing more of the cubic material on the biaxially textured surface and exposing the cubic material to at least one ion beam.

17. (currently amended): The method of claim 1, further comprising at least a third ion beam wherein ~~the~~ at least two ion beams simultaneously impinge on the noncrystalline surface.

18. (canceled)

19. (original): The method of claim 1, wherein the at least two ion beams are two ion beams.

20. (original): The method of claim 1, wherein the at least two ion beams are three ion beams.

21. (original): The method of claim 1, wherein the at least two ion beams are four ion beams.

22. (currently amended): A method of ion texturing a noncrystalline surface of a layer of a material, the method comprising:

exposing the noncrystalline surface to at least two ion beams to texture the noncrystalline surface and form a textured surface of the material,

<u>wherein the at least two ion beams impinge on the noncrystalline surface in sequence, and</u>

wherein a first ion beam of the at least two ion beams impinges on the surface at a first angle relative to the perpendicular to the noncrystalline surface, a second ion beam of the at least two ion beams impinges on the surface of the noncrystalline layer at a second angle relative to a perpendicular to the noncrystalline surface, the at least two ion beams being disposed relative to each other at a third angle so that a crystal plane of the biaxially textured surface is oriented perpendicular to the biaxially textured surface.

23. (original): The method of claim 22, wherein the at least two ion beams are two ion beams.

24. (original): The method of claim 22, wherein the at least two ion beams are three ion beams.

25. (original): The method of claim 22, wherein the at least two ion beams are four ion beams.

26. (original): The method of claim 22, wherein the at least two ion beams simultaneously impinge on the noncrystalline surface.

27. (canceled)

28. (original): The method of claim 22, further comprising, before exposing the noncrystalline surface to the at least two ion beams, forming the layer of the material having the noncrystalline surface by simultaneously depositing the material and exposing the material to at least one ion beam.

29. (original): The method of claim 22, further comprising, after forming the biaxially textured surface, simultaneously depositing more of the material on the textured surface and exposing the material to at least one ion beam.

30. (original): The method of claim 22, further comprising disposing a layer of a second material on the textured surface of the material, the second material being selected from the group consisting of superconductor materials, precursors of superconductor materials, materials that are chemically compatible with superconductor materials, and materials that are chemically compatible with precursors of superconductor materials.

31. (original): The method of claim 30, wherein the second material is chemically compatible with BaF_2.

32. (original): The method of claim 30, wherein the second material is selected from the group consisting of ceria, $LaAlO_3$ and $SrTiO_3$.

33. (original): The method of claim 30, wherein the second material is selected from the group consisting of YBCO and precursors of YBCO.

34. (original): The method of claim 30, wherein the material is at an exposure temperature during exposure to the at least two ion beams, the exposure temperature being less than a crystallization temperature of the material.

35. (original): The method of claim 34, wherein the exposure temperature is less than about one third of the crystallization temperature of the material.

36. (original): The method of claim 22, wherein the textured surface is biaxially textured.

37. (original): The method of claim 22, wherein the textured surface is cube textured.

38. (original): The method of claim 22, wherein the material is selected from the group consisting of cubic structure materials and hexagonal structure materials.

39. (original): The method of claim 22, wherein the material is selected from the group consisting of rock salt structure materials and fluorite structure materials.

40. (original): The method of claim 22, wherein an ion flux at the surface of the material is at least about 10 microAmperes per square centimeter.

41. (original): The method of claim 22, wherein the crystal plane is the (001) plane.

42. (original): The method of claim 22, wherein the method textures the material to a depth of less than about 50 nanometers.

43. (original): The method of claim 22, wherein the textured surface has a X-ray phi scan full width at half maximum of less than about 20°.

44. (original): The method of claim 22, wherein the textured surface has a root mean square roughness of less than about 100 angstroms.

45. (original): The method of claim 22, wherein the noncrystalline layer is supported by a substrate.

46. (original): The method of claim 45, wherein the substrate is a nontextured substrate.

47. (original): The method of claim 22, wherein the method is performed in a pressure of less than about 10 millitorr.

48. (original): The method of claim 22, wherein exposure to the ions occurs for a time period of at least about 10 seconds.

49. (original): The method of claim 22, further comprising, after an initial ion exposure, decreasing the temperature while exposing the surface to ions.

50. (original): The method of claim 22, wherein the first angle is different than the second angle.

51. (currently amended): A method, comprising:

exposing a surface of a noncrystalline layer of a first material to at least two ion beams to texture the noncrystalline surface and to form a textured surface of the first material; ~~and~~

wherein the at least two ion beams impinge on the noncrystalline surface in sequence, and

disposing a layer of a second material on the textured surface of the first material, the second material being chemically compatible with a third material selected from the group consisting of superconductors and precursors of superconductors.

52. (original): The method of claim 51, wherein the third material is selected from the group consisting of rare earth metal oxide superconductors and precursors of rare earth metal oxide superconductors.

53. (original): The method of claim 51, wherein the third material is selected from the group consisting of YBCO and precursors of YBCO.

54. (original): The method of claim 51, wherein the third material comprises an acid.

55. (original): The method of claim 51, wherein the third material comprises a halogenated acetic acid.

56. (original): The method of claim 51, wherein the third material comprises trifluoroacetic acid.

57. (original): The method of claim 51, wherein the third material comprises BaF_2.

58. (original): The method of claim 51, wherein the method forms a superconductor article having a critical current density of at least about 5×10^5 Amperes per square centimeter.

59. (original): The method of claim 51, wherein the second material comprises a material selected from the group consisting of ceria, $LaAlO_3$ and $SrTiO_3$.

60. (original): The method of claim 51, wherein the first material is selected from the group consisting of YSZ and nitrides.

61. (original): The method of claim 51, further comprising disposing the third material on a surface of the second material.

62. (original): The method of claim 61, wherein the third material comprises YBCO.

63. (original): The method of claim 61, wherein the third material comprises a precursor of YBCO.

64. (currently amended): A method, comprising:

disposing a noncrystalline layer of a second material on a surface of a first material, the second material being chemically compatible with a third material selected from the group consisting of superconductors and precursors of superconductors; and

exposing a surface of the noncrystalline layer of the second material to at least two ion beams to texture the noncrystalline surface and to form a textured surface of the second material;

wherein the at least two ion beams impinge on the noncrystalline surface in sequence.

65. (original): The method of claim 64, wherein the third material is selected from the group consisting of rare earth metal oxide superconductors and precursors of rare earth metal oxide superconductors.

66. (original): The method of claim 64, wherein the third material is selected from the group consisting of YBCO and precursors of YBCO.

67. (original): The method of claim 64, wherein the third material comprises an acid.

68. (original): The method of claim 64, wherein the third material comprises a halogenated acetic acid.

69. (original): The method of claim 64, wherein the method forms a superconductor article having a critical current density of at least about 5×10^5 Amperes per square centimeter.

70. (original): The method of claim 64, wherein the layer of the first material is noncrystalline.

71. (original): The method of claim 64, wherein the second material comprises a material selected from the group consisting of ceria, $LaAlO_3$ and $SrTiO_3$.

72. (original): The method of claim 64, wherein the first material is selected from the group consisting of YSZ and nitrides.

73. (original): The method of claim 64, further comprising disposing the third material on a surface of the second material.

74. (original): The method of claim 73, wherein the third material comprises a rare earth metal oxide.

75. (original): The method of claim 73, wherein the third material comprises a precursor of a rare earth metal oxide.

Claims 76-96 (canceled)

97. (currently amended): A system, comprising:

a first ion beam source capable of emitting a first ion beam; and

a second ion beam source capable of emitting a second ion beam,

wherein the first and second ion beam sources are positioned so that when they emit the first and second ion beams, respectively, to impinge on a surface to texture the surface, the first ion beam is disposed at a first angle relative to a perpendicular to the surface and the second ion beam is disposed at a second angle relative to the perpendicular to the surface, and the first and second ion beams are disposed relative to each other at a third angle so that a crystal plane of the textured surface is oriented perpendicular to the textured surface; and

wherein said first and second ion beam sources are configured for sequential emission of at least two said ion beams.

98. (original): The system of claim 97, wherein the third angle is about 90°.

99. (original): The system of claim 97, wherein the first angle is different than the second angle.

100. (original): The system of claim 97, further comprising a third ion beam source capable of emitting a third ion beam.

101. (original): The system of claim 100, wherein the third ion beam source is positioned so that when it emits the third ion beam to impinge on the surface to texture

the surface, the third ion beam is disposed at a fourth angle relative to the perpendicular to the surface, and the first and third ion beams are disposed relative to each other at a fourth angle so that a crystal plane of the textured surface is oriented perpendicular to the textured surface.

102. (original): The system of claim 101, further comprising a fourth ion beam source capable of emitting a fourth ion beam.

103. (original): The system of claim 102, wherein the fourth ion beam source is positioned so that when it emits the fourth ion beam to impinge on the surface to texture the surface, the fourth ion beam is disposed at a fifth angle relative to the perpendicular to the surface, and the fourth and third ion beams are disposed relative to each other at a sixth angle so that a crystal plane of the textured surface is oriented perpendicular to the textured surface.

104. (currently amended): The system of claim 100, further comprising a fourth ion beam source capable of emitting a fourth <u>ion beam.</u>

105. (currently amended): A system, comprising:

first ion beam means for emitting a first ion beam; and

second ion beam means for emitting a second ion beam,

wherein the first and second ion beam means are positioned so that when they emit the first and second ion beams, respectively, to impinge on a surface to texture the surface, the first ion beam means is disposed at a first angle relative to a perpendicular to the surface and the second ion beam means is disposed at a second angle relative to the perpendicular to the surface, and the first and second ion beams are disposed relative to each other at a third angle around the perpendicular to the surface so that a

crystal plane of the textured surface is oriented perpendicular to the textured surface; and

wherein said first and second ion beam sources are configured for sequential emission of at least two said ion beams.

106. (original): The system of claim 105, wherein the third angle is about 90°.

107. (original): The system of claim 105, wherein the first angle is different than the second angle.

108. (original): The system of claim 105, further comprising third ion beam means capable of emitting a third ion beam.

109. (original): The system of claim 108, wherein the third ion beam means is positioned so that when it emits the third ion beam to impinge on the surface to texture the surface, the third ion beam is disposed at a fourth angle relative to the perpendicular to the surface, and the first and third ion beams are disposed relative to each other at a fourth angle around the perpendicular to the surface so that a crystal plane of the textured surface is oriented perpendicular to the textured surface.

110. (original): The system of claim 109, further comprising fourth ion beam means capable of emitting a fourth ion beam.

111. (original): The system of claim 110, wherein the fourth ion beam means is positioned so that when it emits the fourth ion beam to impinge on the surface to texture the surface, the fourth ion beam is disposed at a fifth angle relative to the perpendicular to the surface, and the fourth and third ion beams are disposed relative to each other at

a sixth angle around the perpendicular to the surface so that a crystal plane of the textured surface is oriented perpendicular to the textured surface.

112. (original): The system of claim 108, further comprising a fourth ion beam means capable of emitting a fourth ion beam.

113. (new): The method of claim 20, wherein one of the three ion beams impinges on the noncrystalline surface simultaneously with another ion beam.

114. (new): The method of claim 21, wherein at least one of the four ion beams impinges on the noncrystalline surface simultaneously with at least one other ion beam.

115. (new): The method of claim 21, wherein at least two of the four ion beams impinge on the noncrystalline surface simultaneously with at least two other beams.

116. (new): A method as recited in claim 1, wherein at least two ion beams impinge sequentially and at least two ion beams impinge simultaneously.

117. (new): A method as recited in claim 22, wherein at least two ion beams impinge sequentially and at least two ion beams impinge simultaneously.

118. (new): A method as recited in claim 51, wherein at least two ion beams impinge sequentially and at least two ion beams impinge simultaneously.

119. (new): A method as recited in claim 64, wherein at least two ion beams impinge sequentially and at least two ion beams impinge simultaneously.

120. (new): A method of ion texturing a noncrystalline surface of a layer of a cubic structure material, the method comprising:

exposing the noncrystalline surface to at least two ion beams simultaneously to texture the noncrystalline surface and form a biaxially textured surface of the cubic structure material,

wherein the at least two ion beams impinge on the surface of the noncrystalline layer at a first angle relative to a perpendicular to the noncrystalline surface, the at least two ion beams being disposed relative to each other at a second angle around the perpendicular to the noncrystalline surface so that a crystal plane of the biaxially textured surface is oriented perpendicular to the biaxially textured surface; and

wherein at least one said step of exposing the noncrystalline surface to said at least two ion beans is not carried out simultaneously with carrying out deposition on said surface.

121. (new): The method of claim 120, wherein the cubic structure material comprises YSZ and the first angle is from about 51° to about 59°.

122. (new): The method of claim 121, wherein the first angle is about 55°.

123. (new): The method of claim 120, wherein the cubic structure material comprises YSZ and the YSZ is at a temperature of from about room temperature to about 900°C during ion texturing.

124. (new): The method of claim 123, wherein the first angle is about 55°.

125. (new): The method of claim 120, wherein the cubic structure material comprises a material selected from the group consisting of rock salt structure materials and fluorite structure materials.

126. (new): The method of claim 120, wherein the cubic structure material comprises a material selected from the group consisting of MgO, TiN, CaO, SrO, ZrO, BaO, YSZ and ceria.

127. (new): The method of claim 120, wherein the second angle is about 180°.

128. (new): The method of claim 120, wherein the second angle is about 90°.

129. (new): The method of claim 120, further comprising disposing a layer of a second material on the biaxially textured surface of the cubic structure material, the second material being selected from the group consisting of superconductor materials, precursors of superconductor materials, materials that are chemically compatible with superconductor materials, and materials that are chemically compatible with precursors of superconductor materials.

130. (new): The method of claim 129, wherein the second material is chemically compatible with BaF_2.

131. (new): The method of claim 129, wherein the second material is selected from the group consisting of ceria, $LaAlO_3$ and $SrTiO_3$.

132. (new): The method of claim 129, wherein the second material is selected from the group consisting of YBCO and precursors of YBCO.

133. (new): The method of claim 120, wherein biaxially textured surface of the cubic structure material is cube textured.

134. (new): The method of claim 120, further comprising, before exposing the noncrystalline surface to the at least two ion beams, forming the layer of the cubic structure material having the noncrystalline surface by simultaneously depositing the cubic material and exposing the cubic material to at least one ion beam.

135. (new): The method of claim 120, further comprising, after forming the biaxially textured surface, simultaneously depositing more of the cubic material on the biaxially textured surface and exposing the cubic material to at least one ion beam.

136. (new): The method of claim 120, wherein the at least two ion beams are two ion beams.

137. (new): The method of claim 120, wherein the at least two ion beams are three ion beams.

138. (new): The method of claim 120, wherein the at least two ion beams are four ion beams.

139. (new): A method of ion texturing a noncrystalline surface of a layer of a material, the method comprising:

exposing the noncrystalline surface to at least two ion beams simultaneously to texture the noncrystalline surface and form a textured surface of the material,

wherein a first ion beam of the at least two ion beams impinges on the surface at a first angle relative to the perpendicular to the noncrystalline surface, a second ion beam of the at least two ion beams impinges on the surface of the noncrystalline layer at a second angle relative to a perpendicular to the noncrystalline surface, the at least two ion beams being disposed relative to each other at a third angle so that a crystal

plane of the biaxially textured surface is oriented perpendicular to the biaxially textured surface; and

wherein at least one said step of exposing the noncrystalline surface to said at least two ion beans is not carried out simultaneously with carrying out deposition on said surface.

140. (new): The method of claim 139, wherein the at least two ion beams are two ion beams.

141. (new): The method of claim 139, wherein the at least two ion beams are three ion beams.

142. (new): The method of claim 139, wherein the at least two ion beams are four ion beams.

143. (new): The method of claim 139, wherein the at least two ion beams simultaneously impinge on the noncrystalline surface.

144. (new): The method of claim 139, further comprising, before exposing the noncrystalline surface to the at least two ion beams, forming the layer of the material having the noncrystalline surface by simultaneously depositing the material and exposing the material to at least one ion beam.

145. (new): The method of claim 139, further comprising, after forming the biaxially textured surface, simultaneously depositing more of the material on the textured surface and exposing the material to at least one ion beam.

146. (new): The method of claim 139, further comprising disposing a layer of a second material on the textured surface of the material, the second material being selected from the group consisting of superconductor materials, precursors of superconductor materials, materials that are chemically compatible with superconductor materials, and materials that are chemically compatible with precursors of superconductor materials.

147. (new): The method of claim 146, wherein the second material is chemically compatible with BaF_2.

148. (new): The method of claim 146, wherein the second material is selected from the group consisting of ceria, $LaAlO_3$ and $SrTiO_3$.

149. (new): The method of claim 146, wherein the second material is selected from the group consisting of YBCO and precursors of YBCO.

150. (new): The method of claim 146, wherein the material is at an exposure temperature during exposure to the at least two ion beams, the exposure temperature being less than a crystallization temperature of the material.

151. (new): The method of claim 150, wherein the exposure temperature is less than about one third of the crystallization temperature of the material.

152. (new): The method of claim 139, wherein the textured surface is biaxially textured.

153. (new): The method of claim 139, wherein the textured surface is cube textured.

154. (new): The method of claim 139, wherein the material is selected from the group consisting of cubic structure materials and hexagonal structure materials.

155. (new): The method of claim 139, wherein the material is selected from the group consisting of rock salt structure materials and fluorite structure materials.

156. (new): The method of claim 139, wherein an ion flux at the surface of the material is at least about 10 microAmperes per square centimeter.

157. (new): The method of claim 139, wherein the crystal plane is the (001) plane.

158. (new): The method of claim 139, wherein the method textures the material to a depth of less than about 50 nanometers.

159. (new): The method of claim 139, wherein the textured surface has a X-ray phi scan full width at half maximum of less than about 20°.

160. (new): The method of claim 139, wherein the textured surface has a root mean square roughness of less than about 100 angstroms.

161. (new): The method of claim 139, wherein the noncrystalline layer is supported by a substrate.

162. (new): The method of claim 161, wherein the substrate is a nontextured substrate.

163. (new): The method of claim 139, wherein the method is performed in a pressure of less than about 10 millitorr.

164. (new): The method of claim 139, wherein exposure to the ions occurs for a time period of at least about 10 seconds.

165. (new): The method of claim 139, wherein the first angle is different than the second angle.

166. (new): The method of claim 139, further comprising, after an initial ion exposure, decreasing the temperature while exposing the surface to ions.

167. (currently amended): A method, comprising:

exposing a surface of a noncrystalline layer of a first material to at least two ion beams simultaneously to texture the noncrystalline surface and to form a textured surface of the first material; ~~and~~

disposing a layer of a second material on the textured surface of the first material, the second material being chemically compatible with a third material selected from the group consisting of superconductors and precursors of superconductors;

wherein at least one said step of exposing the noncrystalline surface to said at least two ion beans is not carried out simultaneously with carrying out deposition on said surface.

168. (new): The method of claim 167, wherein the third material is selected from the group consisting of rare earth metal oxide superconductors and precursors of rare earth metal oxide superconductors.

169. (new): The method of claim 167, wherein the third material is selected from the group consisting of YBCO and precursors of YBCO.

170. (new): The method of claim 167, wherein the third material comprises an acid.

171. (new): The method of claim 167, wherein the third material comprises a halogenated acetic acid.

172. (new): The method of claim 167, wherein the third material comprises trifluoroacetic acid.

173. (new): The method of claim 167, wherein the third material comprises BaF_2.

174. (new): The method of claim 167, wherein the method forms a superconductor article having a critical current density of at least about 5×10^5 Amperes per square centimeter.

175. (new): The method of claim 167, wherein the second material comprises a material selected from the group consisting of ceria, $LaAlO_3$ and $SrTiO_3$.

176. (new): The method of claim 167, wherein the first material is selected from the group consisting of YSZ and nitrides.

177. (new): The method of claim 167, further comprising disposing the third material on a surface of the second material.

178. (new): The method of claim 167, wherein the third material comprises YBCO.

179. (new): The method of claim 167, wherein the third material comprises a precursor of YBCO.

180. (currently amended): A method, comprising:

disposing a noncrystalline layer of a second material on a surface of a first material, the second material being chemically compatible with a third material selected from the group consisting of superconductors and precursors of superconductors; and

exposing a surface of the noncrystalline layer of the second material to at least two ion beams simultaneously to texture the noncrystalline surface and to form a textured surface of the second material;

wherein at least one said step of exposing the noncrystalline layer of said second material to said at least two ion beans is not carried out simultaneously with carrying out deposition on said second material.

181. (new): The method of claim 180, wherein the third material is selected from the group consisting of rare earth metal oxide superconductors and precursors of rare earth metal oxide superconductors.

182. (new): The method of claim 180, wherein the third material is selected from the group consisting of YBCO and precursors of YBCO.

183. (new): The method of claim 180, wherein the third material comprises an acid.

184. (new): The method of claim 180, wherein the third material comprises a halogenated acetic acid.

185. (new): The method of claim 180, wherein the method forms a superconductor article having a critical current density of at least about 5×10^5 Amperes per square centimeter.

186. (new): The method of claim 180, wherein the layer of the first material is noncrystalline.

187. (new): The method of claim 180, wherein the second material comprises a material selected from the group consisting of ceria, $LaAlO_3$ and $SrTiO_3$.

188. (new): The method of claim 180, wherein the first material is selected from the group consisting of YSZ and nitrides.

189. (new): The method of claim 180, further comprising disposing the third material on a surface of the second material.

190. (new): The method of claim 189, wherein the third material comprises a rare earth metal oxide.

191. (new): The method of claim 189, wherein the third material comprises a precursor of a rare earth metal oxide.